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10/586,282	03/06/2007	Guillaume Gautier	292952US0PCT	4687
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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER KAO, CHIH CHENG G	
			ART UNIT	PAPER NUMBER
			2882	
			NOTIFICATION DATE	DELIVERY MODE
			05/14/2009	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com  
oblonpat@oblon.com  
jgardner@oblon.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/586,282	<b>Applicant(s)</b> GAUTIER ET AL.	
	<b>Examiner</b> Chih-Cheng Glen Kao	<b>Art Unit</b> 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 January 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 24-59 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 24-44 and 59 is/are allowed.
- 6) ☒ Claim(s) 45-58 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 45-49, 53, 56, and 58 are rejected under 35 U.S.C. 102(b) as being anticipated by Lilley et al. ("Precipitation in LiF Crystals Doped with  $\text{MgF}_2$ ").
2. Regarding claim 45, Lilley et al. discloses a single-crystal lithium fluoride (fig. 6) doped with 0.023 to 0.082 mol per kg (fig. 6; 1.8 mol %  $\text{MgF}_2$  is 0.68 mol  $\text{Mg}^{2+}$  per kg; pg. 574, col. 2, line 11; and fig. 6; 1.8 mol %  $\text{MgF}_2$  is 0.68 mol  $\text{Mg}^{2+}$  per kg) of a divalent positive ion M present in the fluorinated state (fig. 6,  $\text{MgF}_2$ ).
3. Regarding claim 46, Lilley et al. further discloses wherein the ionic radius of the divalent ion M (fig. 6,  $\text{Mg}^{2+}$ ) necessarily ranges from 55 to 80 picometers.
4. Regarding claims 47 and 48, Lilley et al. further discloses wherein M is present (fig. 6,  $\text{MgF}_2$ ) in an amount of at least 0.025 mol per kg, or at most 0.045 mol per kg (pg. 574, col. 2, line 11; fig. 6; 1.8 mol %  $\text{MgF}_2$  is 0.68 mol  $\text{Mg}^{2+}$  per kg).

Art Unit: 2882

5. Regarding claim 49, Lilley et al. further discloses wherein M is  $Mg^{2+}$  (title).
6. Regarding claim 53, Lilley et al. further discloses wherein said fluoride is present in the form of a cube (paragraph connecting pgs. 571 and 572) or a parallelepiped.
7. Regarding claim 56, Lilley et al. further discloses wherein said fluoride has a cleaved surface (pg. 573, col. 2, last paragraph).
8. Regarding claim 58, Lilley et al. further discloses utilizing the fluoride (abstract).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 50 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lilley et al. as applied to claim 45 above, and further in view of Khulugurov et al. ("Laser active F-aggregate colour centres in LiF monocrystals doped by divalent impurity cations").
10. Regarding claim 50, Lilley et al. discloses the manufacture as recited above.  
However, Lilley et al. fails to specifically disclose wherein M is  $Co^{2+}$ .

Art Unit: 2882

Khulugurov et al. teaches wherein M is  $\text{Co}^{2+}$  (title; abstract, lines 1-2; and pg. 7006, section titled "2. Experimental details", lines 1-2).

It would have been obvious, to one having ordinary skill in the art, at the time the invention was made, to modify the manufacture of Lilley et al. with the  $\text{Co}^{2+}$  of Khulugurov et al., because of the following rationale.

Since the Examiner finds that the prior art (i.e., Lilley et al.) contained a manufacture which differed from the claimed manufacture by the substitution of one element for another, and since the Examiner finds that the substituted elements and their functions were known in the art (as shown by Khulugurov et al. in the title and abstract), the Examiner thus finds that one of ordinary skill in the art could have substituted one known element for another, and the results of the substitution would have been predictable. Therefore, such a claimed combination would have been obvious.

11. Regarding claim 52 and for purposes of being concise, Lilley et al. in view of Khulugurov et al. suggests the manufacture as recited above. Khulugurov et al. further teaches wherein M is  $\text{Co}^{2+}$  (title; abstract, lines 1-2; and pg. 7006, section titled "2. Experimental details", lines 1-2) as noted above.

However, Lilley et al. fails to specifically disclose wherein M is a mixture of at least two ions chosen from  $\text{Mg}^{2+}$ ,  $\text{Zn}^{2+}$  and  $\text{Co}^{2+}$ .

It would have been obvious, to one having ordinary skill in the art, at the time the invention was made, to further modify the manufacture of Lilley et al. with the mixture of at least two ions chosen from  $\text{Mg}^{2+}$ ,  $\text{Zn}^{2+}$  and  $\text{Co}^{2+}$ , because of the following rationale.

Art Unit: 2882

Since the Examiner finds that the prior art included each element claimed, although not necessarily in a single embodiment, with the only difference between the claimed invention and the prior art being the lack of actual combination of the elements in a single embodiment, and since the Examiner finds that one of ordinary skill in the art could have combined the elements as claimed by known methods, and that in combination, each element merely performs the same function as it does separately, the Examiner thus finds that one of ordinary skill in the art would have recognized that the results of the combination were predictable. Therefore, such a claimed combination would have been obvious.

12. Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lilley et al. as applied to claim 45 above, and further in view of Gupta et al. ("Electrical conductivity studies of cobalt-precipitation in RbCl crystals").

Lilley et al. discloses the manufacture as recited above.

However, Lilley et al. fails to specifically disclose wherein M is  $\text{Zn}^{2+}$ .

Gupta et al. teaches wherein M is  $\text{Zn}^{2+}$  (pg. 271, Section (1)(i), "LiF:  $\text{ZnF}_2$ ").

It would have been obvious, to one having ordinary skill in the art, at the time the invention was made, to modify the manufacture of Lilley et al. with the  $\text{Zn}^{2+}$  of Gupta et al., because of the following rationale.

Since the Examiner finds that the prior art (i.e., Lilley et al.) contained a manufacture which differed from the claimed manufacture by the substitution of one element for another, and since the Examiner finds that the substituted elements and their functions were known in the art (pg. 271, Section (1)(i), as shown by Gupta et al.), the Examiner thus finds that one of ordinary

Art Unit: 2882

skill in the art could have substituted one known element for another, and the results of the substitution would have been predictable. Therefore, such a claimed combination would have been obvious.

13. Claims 54-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lilley et al. as applied to claim 45 above.

Lilley et al. discloses the manufacture as recited above.

However, Lilley et al. fails to specifically disclose wherein the volume of the fluoride ranges from  $2.5 \times 10^{-3} \text{ cm}^3$  to  $30 \text{ cm}^3$ , or wherein the volume of the fluoride ranges from 0.01 to  $20 \text{ cm}^3$ .

It would have been obvious, to one having ordinary skill in the art, at the time the invention was made, to further modify the manufacture of Lilley et al. with the above volume, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. One would have been motivated to make such a modification for more easily handling the component.

14. Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lilley et al. as applied to claim 45 above, and further in view of Wittry (US 4882780).

Lilley et al. discloses the manufacture as recited above.

However, Lilley et al. fails to disclose wherein the fluoride has a surface that is ground and then treated in an acid medium or polished.

Art Unit: 2882

Wittry teaches wherein a fluoride (col. 12, lines 38-40) has a surface that is ground and then treated in an acid medium or polished (col. 10, lines 56-69).

It would have been obvious, to one having ordinary skill in the art, at the time the invention was made, to modify the manufacture of Lilley et al. with the polishing of Wittry, since one would have been motivated to make such a modification for reducing imperfections to obtain better radiation signals from the fluoride.

*Allowable Subject Matter*

15. Claims 24-44 and 59 are allowed. The following is a statement of reasons for the indication of allowable subject matter.

16. Regarding claim 24, the prior art fails to disclose or fairly suggest an analyzer, including a detector that receives the diffraction lines and converts the diffraction lines into an electrical signal, wherein: the monochromator comprises a single-crystal lithium fluoride doped with at least 0.018 mol per kg of a divalent positive ion M present in a fluorinated state; and the analyzer is configured to perform elemental analysis of the sample, in combination with all of the other limitations in the claim. Claims 25-44 are allowed by virtue of their dependency.

17. Regarding claim 59, the prior art fails to disclose or fairly suggest a process for performing elemental analysis of a sample, including detecting the diffraction lines and converting the diffraction lines into an electrical signal with a detector; wherein the monochromator comprises a single-crystal lithium fluoride doped with at least 0.018 mol per kg



Art Unit: 2882

of a divalent positive ion M present in a fluorinated state, in combination with all of the other limitations in the claim.

***Response to Arguments***

18. Applicant's arguments with respect to claims 45-58 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (571)272-2492. The examiner can normally be reached on M - F (9 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Chih-Cheng Glen Kao/  
Primary Examiner, Art Unit 2882